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THE FIRST FOUR RULES OF ARITHMETIC,

RENDERED SO EASY AS TO BE LEARNED IN A FEW WEEKS WITHOUT THE HELP OF A MASTER.

BY THE

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PREFACE.

I HAVE ever thought myſelf happy, when I could be of uſe to mankind. Looking over the books of Arithmetic already publiſhed, I have found none ſufficiently clear and conciſe to make a common accomptant without the help of a maſter: and as nineteen perſons out of twenty never have any occaſion to trouble themſelves with more than the firſt four rules of Arithmetic, and are not in a ſituation always where they can procure the aſſiſtance of a maſter, I have drawn out a plain account of theſe four rules, and flatter myſelf that with the help of a ſet of Tables, which I have likewiſe framed and called

TRUS-

P R E F A C E.

Trusler's Family Tables*, *any common underſtanding may be in a few weeks ſufficiently maſter of Arithmetic to anſwer all the common purpoſes of life.*

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[*] Theſe Tables may be had of the publiſher of this volume.

NUMERATION

TEACHES to read or write any ſum in figures (refer to the Table) and that ſeries of figures beginning with the ſingle figure 9, and read upwards, will be in words as follow:

Nine.
Ninety-eight.
Nine hundred and eighty-ſeven.
Nine thouſand, eight hundred and ſeventy-ſix.
Ninety-eight thouſand, ſeven hundred and ſixty-five.
Nine hundred eighty-ſeven thouſand, ſix hundred and fifty-four.
Nine millions, eight hundred ſeventy-ſix thouſand, five hundred and forty-three.
Ninety-eight millions, ſeven hundred ſixty-five thouſand, four hundred and thirty-two.
Nine hundred eighty-ſeven millions, ſix hundred fifty-four thouſand, three hundred and twenty-one.

NUMERATION TABLE.

Hundreds of Millions.	Tens of Millions.	Millions.	Hundreds of Thouſands.	Tens of Thouſands.	Thouſands.	Hundreds.	Tens.	Units.
9	8	7,	6	5	4,	3	2	1
	9	8,	7	6	5,	4	3	2
		9,	8	7	6,	5	4	3
			9	8	7,	6	5	4
				9	8,	7	6	5
					9,	8	7	6
						9	8	7
							9	8
								9

I. ADDITION.

THE firſt rule in Arithmetic is Addition, by which we add one or more ſums to another.

Care muſt be taken here in ſetting down, or placing the figures. Units muſt be put under units, tens under tens, and ſo on. See the Numeration Table in the preceding page, or the following ſums:

£.
87
5
131
42
——
Total 265£.
——

To add theſe figures together, begin with the units in the lower line, and add them to the units above, proceeding on ſo to the top. Thus 2 and 1 is 3; 3 and 5 is 8; 8 and 7 is 15; then ſet down the 5 under the units and carry the ten to the tens; thus 1 ten and 4 is 5; 5 and 3 is 8; 8 and 8 is 16; that is 16 tens; put down the 6 under the tens, and carry the ten or ten tens, that is the one 100 to the hundreds; thus, 1 and 1 is 2; then put down the 2, and the ſum total will be 265.

To prove whether this be done right, add the figures over again, but begin at the top and reckon downwards; for example, 7 and 5 is 12; 12 and 1 is 13; 13 and 2 is 15; and ſo on; and if the ſum total is the ſame as the firſt, the work is ſuppoſed to be right done.

ADDITION AND SUBTRACTION TABLE,

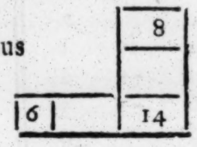
Which ſhould be got by heart.

1	2	3	4	5	6	7	8	9
2	4	5	6	7	8	9	10	11
3	5	6	7	8	9	10	11	12
4	6	7	8	9	10	11	12	13
5	7	8	9	10	11	12	13	14
6	8	9	10	11	12	13	14	15
7	9	10	11	12	13	14	15	16
8	10	11	12	13	14	15	16	17
9	11	12	13	14	15	16	17	18

The Uſe of this Table in Addition.

To find what any two figures make, ſuppoſe 6 and 8; look for 6 in the firſt or left hand column and 8 in the top line, and the ſum in the angle made by the two lines will be 14, the anſwer required.

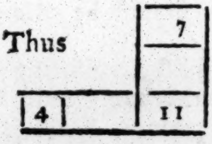
Thus



The Uſe of this Table in Subtraction.

To find what ſum any one figure ſubtracted or taken from the other will leave; ſuppoſe 4 from 11; look for 4 in the firſt or left hand column and 11 in the ſame line with 4; then carry your eye to the top, and the figure in the top line over 11 will be 7, the thing required.

Thus



Sums in Addition where they conſiſt only of one denomination, whether pounds, hundreds, months, days, &c.

	£.	Cwt.	Months.	Days.
	145	275		
	23	321	1321	27014
	4	48	1570	35760
	32	9	7650	42199
	1235	43	8329	89765
Total	1439 £	696 Cwt.	18870 Mon.	194738 Days.

ADDITION of MONEY, WEIGHTS, and MEASURES.

Of Money.

PENCE TABLE.

d.		s.	d.
20	is	1	8
30	—	2	6
40	—	3	4
50	—	4	2
60	—	5	0
70	—	5	10
80	—	6	8
90	—	7	6
100	—	8	4
110	—	9	2
120	—	10	0

d.		s.
12	is	1
24	—	2
36	—	3
48	—	4
60	—	5
72	—	6
84	—	7
96	—	8
108	—	9
120	—	10
132	—	11
144	—	12

SHILLING TABLE.

s.		£.	s.
20	is	1	0
30	—	1	10
40	—	2	0
50	—	2	10
60	—	3	0
70	—	3	10
80	—	4	0
90	—	4	10
100	—	5	0
110	—	5	10
120	—	6	0

Theſe Tables ſhould be alſo got by heart.

If the money be Engliſh, conſiſting of pounds, ſhillings, pence, and farthings, the ſums muſt be ſo placed, that the pounds ſhall be under pounds, ſhillings under ſhillings, and ſo on. - Thus

	£.	s.	d.
	25	10	$8\frac{3}{4}$
	15	0	$7\frac{1}{4}$
	4	12	$0\frac{1}{2}$
	40	5	7
Total	£85	8	$11\frac{1}{2}$

To caſt up theſe ſums begin at bottom with the farthings; thus 2 and 1 is 3; 3 and 3 is 6; now 6 farthings is one penny and 2 farthings over; ſet down then the 2 farthings under the farthings and carry the penny to the pence: thus 1 penny and 7 is 8; 8 and 7 is 15; 15 and 8 is 23; now by the Pence Table you will find that 23d. is 1s. 11d.; put down the 11d. under the pence and carry the 1s. to the ſhillings: thus 1 and 5 is 6; 6 and 12 is 18; 18 and 10 is 28; now 28s. by the Shilling Table appears to be 1l. 8s. ſet down then the 8s. under the ſhillings, and carry the 1l. to the pounds; thus, 1 and 4 is 5; 5 and 5 is 10; 10 and 5 is 15; put down then the unit 5 under the units of the pounds and carry the 1 ten to the tens; thus, 1 and 4 is 5; 5 and 1 is 6; 6 and 2 is 8; then put down the 8, and the ſum is done: viz. £85 8 $11\frac{1}{2}$.

In caſting up a great many ſums of money, as at this mark *, to eaſe the memory, when the number of farthings amounts to 12, which is 3d. make a dot (.) and carry all above 12 to the farthings above; then, when you get to the top, caſt your eye down the farthings and every dot will be 3d. which is eaſily added to the number you have reckoned at the top; for example, ſee the ſum *.

* £.	s.	d.
123	5	8 ¾
4261	14	7 ½
375	10	11.¾
1740	19	4 ¾.
41	17	9 ½
693	18	10 ¾
42	16	11 ½
90	14	8 ¾
22	19	11 ¼
Total £7393	19	0 ½

1 and 3 is 4; 4 and 2 is 6; 6 and 3 is 9; 9 and 2 is 11; 11 and 3 is 14; make a dot here for 12 and carry 2; 2 and 3 is 5; 5 and 2 is 7; 7 and 3 is 10. Now 10 farthings is 2½d. and 3d. for the dot is 5½d. ſet down then the ½ and carry the 5d. to the pence as before.

Now in the pence, when they amount to 60, that is 5s. do the ſame as in the farthings, make a dot (.) and carry the overplus to the figures above; thus, 5d. brought from the farthings and carried to the pence, 5 and 11 is 16; 16 and 8 is 24; 24 and 11 is 35; 35 and 10 is 45; 45 and 9 is 54; 54 and 4 is 58; 58 and 11 is 69: put now a dot for 60d. or 5s, and carry the overplus 9 to the 7 above, which makes 16; 16 and 8 is 24; that by the Pence Table is found to be 2s. and the dot you made is 7s. ſet down then an 0 under the pence and carry the 7s. to the ſhillings.

Now in caſting up the ſhillings, do as follows; caſt up the units of the ſhillings, leaving the tens till afterwards: thus, 7 you brought from the pence and 9 is 16; 16 and 4 is 20; 20 and 6 is 26; 26 and 8 is 34; 34 and 7 is 41; 41 and 9 is 50; 50 and 4 is 54; 54 and 5 is 59: put down then the 9 under the units of ſhillings and carry the 5 to the tens; thus 5 and 1 is 6; 6 and 1 is 7; 7 and 1 is 8; 8 and 1 is 9; 9 and 1 is 10; 10 and 1 is 11; 11 and 1 is 12; 12 and 1 is 13; that is, 13 times 10s.; take then the half of 13 to bring them into pounds; the half of 13 is 6 and 1 over, put down the 1 under the tens of the ſhillings and carry the 6 to the pounds, and caſt them up as before directed.

In caſting up weights or meaſures, whether the weights be Troy, Avoirdupoize, or Apothecaries; or whether the meaſures be Cloth, Wine, Land, or any other, it is done in the ſame way with pounds, ſhillings, and pence, knowing only in the weights how many drams or penny-weights make an ounce; how many ounces make a pound, &c. and in the meaſures, how many inches make a foot, how many feet a yard, and ſo on.

Troy Weight.

Oz.	*dwt.*	*gr.*
6	18	21
7	15	6
2	13	12
8	14	23

Avoirdupoize Weight.

Ton.	*Cwt.*	*qrs.*	*lb.*	*oz.*	*dr.*
3	17	2	14	13	12
5	13	3	27	15	10
6	5	1	16	12	5
4	18	2	12	9	7

Cloth Meaſure.

Yds.	*qrs.*	*nails.*
35	2	2
76	2	1
38	3	3
42	1	1

Land Meaſure.

Acres.	*rds.*	*per.*
26	1	35
29	3	19
37	3	14
79	2	27

Wine Meaſure.

Hds.	*gal.*	*qts.*
44	55	3
93	19	2
63	23	1
47	41	2

II. SUBTRACTION.

BY Subtraction we take a leſs number from a greater, and ſhew the difference or remainder.

	£.
From	284
Take	196
Remainder	88
Proof	284

To do this, begin with the units in the leſs or bottom number, and where you cannot take the lower figure out of the upper, you muſt borrow 10 and add to the upper figure, taking care to repay to the tens, when you come to them, the 1 ten you borrowed. Thus in the ſum in the margin, 6 from 4 you cannot, but borrow 10 and add it to the 4, which makes 14; now take 6 from 14 and there remains 8; ſet down 8 then under the units and carry the 1, which is the ten you borrowed, to the tens; thus, 1 and 9, which makes 10; now 10 from 8 you cannot, but borrow 10 as before, and take the 10 from the 18 and there remains 8; ſet down this 8 then under the tens, and carry the 1, or the one ten you borrowed, to the next figure, which added to the 1 makes 2; now 2 taken from 2 leaves nothing, of courſe you might ſet down an 0; but an 0 ſtanding the firſt figure on the left hand reckons nothing, therefore you may omit ſetting down that 0; and then the anſwer or remainder will be 88 as in the margin.

To prove whether this be done right, add the remainder and the leſs number together; and if the ſum total be the ſame as the upper or greater number, it is right done.

SUBTRACTION of MONEY, WEIGHTS, and MEASURES.

	£.	s.	d.
From	317	16	9¼
Take	298	18	11¾
Rem.	18	17	9½
Proof	317	16	9¼

Begin with the farthings. 3 from 1 you cannot; borrow therefore (not 1 ten as in the pounds) but 1d. being one of the next ſuperior number; thus 1d. or four farthings added to 1 farthing makes 5; now take 3 from 5 and there remains 2; ſet down then 2 farthings under the farthings and carry the 1d. which you borrowed to the pence; thus 1 and 11 is 12; now 12 from 9 you cannot, but borrow 1s. or 12d. being 1 of the next ſuperior number; add this 12d. to the 9 and it makes 21; now 12 from 21 and there remains 9; ſet down then 9 under the pence and carry the 1s. you borrowed to the ſhillings; thus, ſay 1 that I borrowed and 18 is 19; 19 from 16 I cannot, but borrow 1£. from the next ſuperior number, and add this 1£. or 20s. to the 16: thus 20 and 16 is 36; take 19 from 36 and there remains 17; now ſet down 17 under the ſhillings and carry the 1£. you borrowed to the pounds; then ſay, 1 that I borrowed and 8 is 9; 9 from 7 I cannot, but 9 from 17 (borrowing 10) and there remains 8; put down 8 under the pounds and carry the 1 ten borrowed to the next figure; thus, 1 that I borrowed and 9 is 10; 10 from 1 I cannot, but 10 from 11 (borrowing 1 again) and there remains 1; put down that 1 and go on, 1 that I borrowed and 2 is 3; 3 from 3 and there remains nothing.

To prove this, add, as before directed, the remainder and the leſſer ſum together, and if the amount be the ſame as the greater ſum, it is right done.

In Troy Weight, conſiſting of ounces, pennyweights, and grains; when ſubtracting the grains (if neceſſary) borrow a pennyweight: in ſubtracting the pennyweights, borrow (if neceſſary) an ounce, and ſo on. Whatever you are ſubtracting, always borrow from the next ſuperior number, till you come to the greateſt number, I mean greateſt in denomination, not in quantity, and then you muſt borrow ten.

	£.	s.	d.		£.	s.	d.
Borrowed	813	16	7½	Lent	718	16	3½
Paid	709	13	9¾	Received	697	12	8¾
Remains to pay	104	2	9¾	Remains due	21	3	6¾
Proof	813	16	7½	Proof	718	16	3½

	£.	s.	d.		£.	s.	d.
Borrowed	—	—	—	—	716	3	4
Paid at times	36	17	9				
	117	8	4				
	326	13	7	—	480	19	8
Remains to pay					235	3	8

	£.	s.		£.	s.
Lent	—	—	—	43	10
Received at different times	21	0			
	5	10			
	2	17	—	29	7
Remains due				14	3

QUESTIONS

By Way of Application.

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1. The preſent year is 1781. Suppoſing me born in 1735, how old am I?

From 1781
Take 1735

45, the anſwer required.

2. One man was born in 1719, another in 1743; what is the difference of their ages; or how much older is one than the other?

From 1743
Take 1719

24 years, the anſwer.

3. A tradeſman has four cuſtomers upon his book, A. B. C. D. who altogether owe him £327, A. B. and C. owe him of this £219, how much does D. owe him?

£.
From 327
Take 219

£ 108 D. owes.

by4. When an eſtate of £800 a year is reduced to £727 14s. taxes; how much are the taxes paid for ſuch an eſtate?

£. s.
From 800 0
Take 727 14

£ 72 6 anſwer.

5. What is the difference between 6731 and the amount of 217 added to 315?

From 6731
Take { 217
{ 315 — 532

6199 anſwer.

6. A houſe furniſhed is rated at £1516 13s. but without the furniture £1230 2s. what is the price of the furniture?

	£.	s.
From	1516	13
Take	1320	2
£	196	11 anſwer.

7. A man, when firſt he began trade, had in caſh, ſtock, &c. £1520; at the two years end, on counting up his ſtock, book-debts, and caſh, he found the amount £2134 10s. What did he gain in the two years?

	£.	s.
From	2134	10
Take	1520	0
£	714	10 anſwer.

8. A father died worth in effects £3760. He left two ſons, and gave the youngeſt by will a houſe worth £500, and the furniture valued at £236, and 2 horſes valued at £18 each. What remained to the elder ſon?

£.
From 3760

£.
Take { Houſe 500
{ Furniture 236
{ 2 Horſes 36 — 772

£ 2988

III. MULTIPLICATION.

MULTIPLICATION TABLE.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	18	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

To explain the uſe of this table: ſuppoſe you wanted to know how many is 9 times 7? Look for the figure 9 in the firſt column on the left hand and the figure 7 in the top line, and the number ſought for will be found in the angle between them.

Thus

7

9 63

By Multiplication, we multiply any given number by another, which ſaves the trouble of a great many additions of the ſame number. Thus inſtead of adding 3, ten times together to make 30, we multiply 3 by 10 to produce the ſame amount.

In this rule there are three terms to be remembered; viz.

1. The Multiplicand, or number to be multiplied;
2. The Multiplier, or number by which we multiply;
3. The Product, or number produced by multiplying.

Multiply 325 by 7.

To do this, ſet your figures down thus:

Multiplicand	325
Multiplier,	7
Product	2275

To be ready at Multiplication or Diviſion, it is eſſentially neceſſary to have the Multiplication Table by heart, and perfectly ſo. This done, multiply firſt the units of the multiplicand by the multiplier. Thus ſay, as above, 7 times 5 is 35; then ſet down 5 under the units and carry the 3 in your mind; then multiply the 2d figure in the multiplicand by the multiplier, and ſay 7 times 2 is 14 and the 3 that I brought from the units is 17; ſet down the 7 and carry on the 1 as before; then multiply the next figure, and ſay 7 times 3 is 21 and the 1 I carried is 22. This 3 being the laſt figure to multiply, ſet down the 22, and the product or anſwer will be 2275.

The uſual way of proving Multiplication is by caſting out the nines from the multiplicand and multiplier; the remainder put on each ſide of a croſs; then multiply the figures on each ſide together, caſt the nines from the product, and put the remainder at the top; then caſt out the nines from the product of the multiplication and place the overplus at the bottom; and if the bottom figure is the ſame with the top, the work is ſuppoſed to be done right. Thus, to prove the ſum juſt done; throw out the nines from the multiplicand 325. How many times 9 in 32? 3 times is 27 and 5 over, carry this 5 and annex it to the next figure 5, and it makes 55; the nines in 55 are 6 and 1 over, which I put on one ſide of a croſs, as at (*a*) Next enquire how many nines in 7, the multiplier? None, and 7 over; put that on the other ſide of the croſs, as at (*b*); then multiply the figures on each

(*a*) 1 X

(*b*) 1 X 7

(c)
7
1 X 7

(d)
7
1 X 7
7

each ſide the croſs together, thus 7 times 1 is 7; and as there are no nines in 7 put the 7 at top, as at (c). Now if by caſting out the nines in the product, there is a remainder of 7, the work was done right. Enquire into this: throw out the nines in the product 2275. How many nines in 22? Twice 9 is 18 and 4 over; carry this 4 to the next figure 7 and it makes 47. How many nines in 47? 5 times 9 is 45 and 2 over; carry this 2 to the next figure 5 and it makes 25: How many nines in 25? Twice 9 is 18 and 7 over: thus you ſee the bottom figure in the croſs (d) is 7, the ſame as at the top.

But the ſureſt way is to divide the product by the multiplicand, and the quotient or product of ſuch diviſion will be the ſame as the multiplier.

When the multiplier conſiſts of ſeveral figures, there muſt be as many products as there are figures in the multiplier; but take care to place the firſt figure on the right hand of every product under that figure you multiply by; add theſe ſeveral products together and their ſum will be the total product. Thus ~~multiply~~ 17856 by 325.

0
0 X 1
0

Multiplicand	17856
Multiplier	325
Product	89280
Product	35712
Product	53568
Total Product	5803200

When there are cyphers between the figures in the multiplier, they may be omitted, placing an 0 under the 0 in the multiplier, and taking care to place the firſt figure of the next product further to the left, under the figure by which you multiply. Thus,

7
5 X 5
7

Multiplicand	1625
Multiplier	104
Product	6500
Product	16250
Total Product	169000

When there are any cyphers at the end of the multiplicand or multiplier, they may be omitted, by only multiplying by the reſt of the figures, and ſetting down on the right hand of the total product as many cyphers as were omitted. Thus,

1	Multiplicand	140
5 X 2	Multiplier	20
1	Product	2800

0	Multiplicand	27000
0 X 2	Multiplier	200
0	Product	5400000

MULTIPLICATION of MONEY, &c.

	£.	s.	d.
Multiplicand	25	13	2½
Multiplier			3
Product	76	19	7½

To do this multiply firſt the farthings; ſay 3 times 2 farthings is 6; that is, 1d. and 2 farthings over; ſet down the 2 farthings and carry the 1d. to the pence; then ſay 3 times 2d. is 6d. and the penny I brought from the farthings is 7d.; ſet down then the 7d. under the pence and proceed to the ſhillings. Next multiply the ſhillings, and ſay, 3 times 13 is 39; that is, 1l. 19s. put down the 19s. and carry the £1 to the pounds, ſaying 3 times 5 is 15 and the £1 brought from the ſhillings is 16; put down the 6 under the units of the pounds and carry the 1, or one ten, to the next figure; thus 3 times 2 is 6 and 1 is 7, and put down the 7; and the ſum is done. 76l. 19s. 7½d.

The proof of this is by diviſion, that is, by dividing 76l. 19s. 7½d. by 3, and if the quotient or product of that diviſion is 25l. 13s. 2½d. the ſame as the multiplicand, it was right done.

Multiplication of any meaſure or weight may be done in the ſame way, remembering only to divide the product by as many of that as make one of the next ſuperior quantity, ſetting down the remainder and adding the quotient or product of ſuch diviſion to the next ſuperior quantity after it is multiplied; as was done in pounds, ſhillings, and pence, carrying the pence to the ſhillings and the ſhillings to the pounds.

If the multiplier is above 12, multiply by any two numbers, which multiplied together will make the ſame number; but if no two numbers multiplied together will make the exact number, then multiply the multiplicand or top line by as many as are wanting, adding it to the laſt product. Thus, multiply 3l. 7s. 2d. by 29 and the product will be 97l. 7s. 10d. worked as follows: multiply firſt by 3 and next by 9 and afterwards by 2; for 3 times 9 is 27 and 2 is 29.

	£.	s.	d.	
Multiply	3	7	2	Multiplicand.
by			3	Multiplier.
Then multiply	10	1	6	Product.
by			9	Multiplier.
	90	13	6	Product.

Next multiply the Multiplicand
or top line 3 7 2
by 2

This 6 14 4 — 6 14 4

added to 90 13 6 gives 97 7 10 the anſwer.

Queſtions by way of Application.

1. What ſum of money does it require to give 14 men 12l. 10s. each.

4 times 3 is 12, and 2 is 14.

Multiply therefore 12 10 firſt
by 4
50 0 and then this
by 3
150 0

Then multiply 12 10
by 2
25 0 added to 150 — 25 0
gives 175 0 the anſwer.

2. The prize money of a merchantſhip taken by a privateer with 250 men on board, when divided equally among them amounted to 15l. 10s. each: what was the value of the prize?

	£.	
Firſt multiply	250	
by	15	for the Pounds,
	1250	
	250	
	£ 3750	then take the half of 250 for the 10s.
and add that	125 £	[10s. being half a £.
	£ 3875	the anſwer required.

3. A merchant had £19118 to begin buſineſs with; for five years he cleared £1086 a year, the next four years he made clear 2715l. 10s. 6d. a year; but the laſt three years he was in trade, he had the misfortune to loſe, one year with another, 475l. 4s. 6d. a year: what was his real fortune at the 12 years end?

	£.	s.	d.	
Multiply	1086			
by	5			
The gain of 5 years	5430			
Multiply	475	4	6	
by			3	
The loſs of 3 years	1425	13	6	
Multiply	2715	10	6	
by			4	
	10862	2	0	the gain of 4 years.
Add	5430	0	0	the gain of 5 years.
	16292	2	0	
Subtract	1425	13	6	the loſs of 3 years.
	14866	8	6	
Add	19118	0	0	the firſt capital.
Total	33984	8	6	the anſwer required.

4. In 780l. 15s. 9d. how many pence?

Multiply the pounds firſt by 20 (there being 20s. in a £.) and add the ſhillings to them, and that product will be ſhillings; then multiply that product by 12, adding the pence, to bring them into pence (there being 12d. in 1s.) Thus,

	£.	s.	d.
Multiply	780	15	9
by	20		
	15600	s.	
Add	15	s.	
Multiply	15615	s.	
by	12	d.	
	187380	d.	
Add	9	d.	
Anſwer	187389	Pence.	

The proof of this by Diviſion, dividing the pence firſt into ſhillings and the ſhillings next into pounds, and if the laſt quotient or product of ſuch diviſion be 780l. 15s. 9d. the multiplication was right.

IV. DIVISION.

BY Diviſion we find how often one number is contained in another, and learn to divide any number into what parts we pleaſe.

1. The number to be divided is called, The Dividend;

2. The number by which we divide, is called, The Diviſor;

3. The number that ſhews how often the diviſor is contained in the dividend, is called, The Quotient.

N. B. If there be any remaining number, after the work is done, it is of the ſame name or denomination as the dividend, as will be further explained.

When the diviſor, or number you divide by, does not exceed 12, your diviſion may be ſhort and eaſily done.

Thus, divide 78510 by 4.

Dividend.
Diviſor 4) 78510 (2 Remainder

19627 the Quotient
Multiply by 4 to prove it

78508
Add 2 Remainder

78510 the Proof.

Place the figures as above; then ſay, how many times 4 in 7? that is, how many times is the diviſor contained in the firſt figure of the dividend? 1 and 3 over, put down 1 then under the 7 and carry the 3, as three tens, to the next figure 8, which makes 38; then ſay how many fours in 38? If you know the Multiplication Table by heart you will know that 9 times 4 is 36; there are 9 fours therefore and 2 over; put down 9 under the 8 and carry the 2 to the next figure 5; then ſay how many fours in 25? 6 times 4 is 24 and 1 over; put down the 6 under the 5 and carry the 1 to the next figure 1, which makes that 1 11. How many fours in 11; 2 times 4 is 8 and 3 over; put down 2 under the 1 and carry the 3 to the 0, which makes it 30; then ſay how many times 4 in 30? 7 times 4 is 28 and 2 over; put down then the 7 under the 0, and place this laſt remaining 2, as you ſee it placed in the ſum above. This remainder is of the ſame name or denomination with the dividend; if that be pounds, this remainder is pounds; if that be yards, this remainder is yards, and ſo on.

To prove this, multiply the quotient by the diviſor, adding the remainder, (if any) and the product, if it be the ſame as the dividend, ſhews that it is right.

Dividend.
Yards. Yd.
Diviſor 9) 64783 (1 Remainder

Quotient 7198 Yards.

Dividend.
£. £.
Diviſor 12) 432075 (3 Remainder

Quotient 36006 £.

If the diviſor be more than 12, try how often it is contained in the firſt two or three figures of the dividend, and when you have found the greateſt number of times it is contained in thoſe figures, ſet that number down in the quotient; then multiply the diviſor by that quotient number; put the product down under the firſt two or three figures of the dividend and ſubtract it from that dividend: then to the remainder bring down the next figure from the dividend, and annex it to the remainder as a new dividend. Do this till you have got through all the figures and the work is done. Thus,

Diviſor.	Dividend.	Quotient.
25)	53468	(2138
	50	25
	•34	10690
	25	4276
		18 Remainder
	•96	
	75	53468 Proof.
	218	
	200	
Remainder	18	

Say how many times 25 in 53? 2. Put down then 2 in the quotient and multiply the diviſor 25 by 2. Twice 25 is 50; put down 50 under the firſt two figures of the dividend, and ſubtract it from them, the remainder will be 3; to this 3 bring down the next figure of the dividend, 4, which annexed to the 3, will make 34 for a new dividend; then ſay how many times 25 in 34? 1. Put down the 1 in the quotient; by this 1 multiply the diviſor 25, ſet down the product under the 34, and ſubtract the 25 from 34, which leaves 9; to this 9 bring down the next figure 6 of the dividend as before, and continue doing the ſame till the whole is finiſhed, and you will find there is 2138 times 25 in 53468 and 18 over.

When there are any cyphers at the end of the diviſor, to ſhorten the work, they may be cut off; but then you muſt alſo cut off as many figures from the end or right hand of the dividend, as you cut off from the diviſor, taking care at the laſt to annex thoſe figures cut from the dividend to the remainder. Thus,

Diviſor.

Thus, divide 78510 by 4.

Dividend.
Diviſor 4) 78510 (2 Remainder

19627 the Quotient
Multiply by 4 to prove it

78508
Add 2 Remainder

78510 the Proof.

Place the figures as above; then ſay, how many times 4 in 7? that is, how many times is the diviſor contained in the firſt figure of the dividend? 1 and 3 over, put down 1 then under the 7 and carry the 3, as three tens, to the next figure 8, which makes 38; then ſay how many fours in 38? If you know the Multiplication Table by heart you will know that 9 times 4 is 36; there are 9 fours therefore and 2 over; put down 9 under the 8 and carry the 2 to the next figure 5; then ſay how many fours in 25? 6 times 4 is 24 and 1 over; put down the 6 under the 5 and carry the 1 to the next figure 1, which makes that 1 11. How many fours in 11; 2 times 4 is 8 and 3 over; put down 2 under the 1 and carry the 3 to the 0, which makes it 30; then ſay how many times 4 in 30? 7 times 4 is 28 and 2 over; put down then the 7 under the 0, and place this laſt remaining 2, as you ſee it placed in the ſum above. This remainder is of the ſame name or denomination with the dividend; if that be pounds, this remainder is pounds; if that be yards, this remainder is yards, and ſo on.

To prove this, multiply the quotient by the diviſor, adding the remainder, (if any) and the product, if it be the ſame as the dividend, ſhews that it is right.

Dividend.
Yards. *Yd.*
Diviſor 9) 64783 (1 Remainder.

Quotient 7198 Yards.

Dividend.
£. £.
Diviſor 12) 432075 (3 Remainder

Quotient 36006 £.

If the diviſor be more than 12, try how often it is contained in the firſt two or three figures of the dividend, and when you have found the greateſt number of times it is contained in thoſe figures, ſet that number down in the quotient; then multiply the diviſor by that quotient number; put the product down under the firſt two or three figures of the dividend and ſubtract it from that dividend: then to the remainder bring down the next figure from the dividend, and annex it to the remainder as a new dividend. Do this till you have got through all the figures and the work is done. Thus,

```
Diviſor.   Dividend.  Quotient.
  25 )      53468      (2138
            50           25
            —          ———
           •34         10690
            25         4276
            —             18 Remainder
           •96         ———
            75         53468 Proof.
            —          ———
           218
           200
           ———
Remainder   18
```

Say how many times 25 in 53? 2. Put down then 2 in the quotient and multiply the diviſor 25 by 2. Twice 25 is 50; put down 50 under the firſt two figures of the dividend, and ſubtract it from them, the remainder will be 3; to this 3 bring down the next figure of the dividend, 4, which annexed to the 3, will make 34 for a new dividend; then ſay how many times 25 in 34? 1. Put down the 1 in the quotient; by this 1 multiply the diviſor 25, ſet down the product under the 34, and ſubtract the 25 from 34, which leaves 9; to this 9 bring down the next figure 6 of the dividend as before, and continue doing the ſame till the whole is finiſhed, and you will find there is 2138 times 25 in 53468 and 18 over.

When there are any cyphers at the end of the diviſor, to ſhorten the work, they may be cut off; but then you muſt alſo cut off as many figures from the end or right hand of the dividend, as you cut off from the diviſor, taking care at the laſt to annex thoſe figures cut from the dividend to the remainder. Thus,

Diviſor. Dividend.
2|00) 7896|54 (54 Rem.
Quotient 3948

Diviſor. Dividend. Quotient.
15|00) 9432|10 (628
90
—
43
30
—
132
120
—
1210 Rem.

When the diviſor may be made of any two figures multiplied together, as 6 times 9, ſuppoſing the diviſor to be 54; or 3 times 7, ſuppoſing it to be 21, or the like; then by dividing the dividend by one figure and the quotient by the other, the remaining quotient will be the anſwer required. But, as it ſometimes happens, that there is a remainder to each of the quotients and neither of them the true one, the right remainder may be thus found.

Multiply the laſt remainder by the firſt diviſor and to that product add the firſt remainder, and this will give the true remainder.

Divide 43280 by 54. To do this, divide firſt by 9 and next by 6; 6 times 9 making 54.

Dividend.
9) 43280 (8 Remainder
6) 4808 Quotient (2 Remainder
The anſwer required 801 (26 remaining.

Laſt Remainder — — 2
Firſt Diviſor — — 9
—
18
Firſt Remainder — 8
—
True Remainder — — 26

Division of Money, &c.

In diviſion of money, divide the firſt denomination on the left hand, that is, the pounds, and if any remain, multiply the remainder by as many of the next leſs denomination as make one of that; for inſtance, 20, 20s. making £1, which add to the ſhillings, being the next leſs denomination, and divide as before; and go on ſo with the pence and the farthings, till the whole is completed. The proof is, as before, by multiplication.

	£.	s.	d.	
6)	37	3	$7\frac{3}{4}$	
	6	3	$11\frac{1}{4}$	
			6	
	37	3	$7\frac{1}{2}$	
			$\frac{1}{4}$	Rem.
	37	3	$7\frac{3}{4}$	Proof.

Say, how many times 6 in 37? 6, and 1 over; put down 6 under the pounds, and multiply that 1 by 20, adding the 3s. this makes 23s. then, how many times 6 in 23? 3, and 5 over; put down the 3 under the ſhillings, and multiply the 5 by 12d. to bring it into pence; 12 times 5 is 60, and add the 7d. this makes 67d.; then, how many times 6 in 67? 11 and 1 over; put down 11 then under the pence, and multiply the 1 by 4, to bring it into farthings, adding the $\frac{3}{4}$. Once 4 is 4 and 3 is 7; how many times 6 in 7? 1, and one farthing over. Thus you have the anſwer 6l. 3s. $11\frac{1}{4}$d. and one farthing over.

The ſame thing you may do by weights and meaſures.

Queſtions by way of Application.

1. If a man ſpends 327l. 6s. in 12 months, how much is that a month?

	£.	s.		
12)	327	6		
	27	5	6	a Month.

2. If 25 yards of linen coſt 4l. 7s. how much is that a yard?

	£.	
Multiply	4	
by	20	to bring it into ſhillings, adding the 7.
25)	87	(3s.
	75	
	12	s. remaining

Multiply 12 *s.* remaining
by 12 *d.* to bring the 12*s.* into pence

25) 144 (5*d.*
125

Multiply 19 *d.* remaining
by 4 farthings to bring the 19*d.* into [farthings.

25) 76 (3 farthings
75

1 farthing remaining.

Thus the anſwer required is 3s. $5\frac{3}{4}$d. a yard.

3. A prize of 9326l. 4s. 3d. divided between 50 men; what is each man's ſhare?

£. *s.* *d.*
Men 5|0) 932|6 4 3

186 (26 £ remaining
20 *s.*

520 *s.*
4 *s.*

5|0) 52|4
10 (24 *s.* remaining
12 *d.*

288 *d.*
3 *d.*

5|0) 29|1

5 (41 *d.* remaining
4 farthings

5|0) 16|4 farthings

Farthings 3 (14 farthings remaining.

Anſwer 186l. 10s. $5\frac{3}{4}$d. and 14 farthings or $3\frac{1}{2}$d. over.

4. In 7699d. how many pounds?

Divide by 12 to bring them into ſhillings, and that quotient by 20 to bring the ſhillings into pounds; but when you have brought the pence into ſhillings, inſtead of dividing by 20, you may cut off the laſt figure on the right hand and take half the reſt, that is, divide by 2: this half will be pounds; if there be 1 remaining that 1 will be 10s. to which add the laſt figure cut off, which is ſhillings alſo.

d. *d.*
12) 7699
64|1 *s.* and 7*d.* over.
32 £ and 1*s.* over.

Anſwer 32l. 1s. 7d.

5. In 365717 ſhillings, how many pounds?

s. *s.*
20) 36571|7
£ 18285 17 anſwer.

6. What does 7325 lb. come to at 1 farthing a lb.

Note. When the price is leſs than a penny, divide by 4, the even parts of a penny, to bring it into pence; then by 12, the even parts of 1s. to bring the pence into ſhillings; and laſt by 20, the even parts of £1 to bring the ſhillings into pounds. Thus,

lb.
4) 7325
12) 1831 *d.* 1 farthing over
20) 15|2 *s.* 7*d.* over
£ 7 12 7¼ the anſwer.

7. What does 346 lb. come to at 3d. a lb.?

Here, as the price is above farthings, you may begin and divide by the 4th part of a ſhilling, which is 3d. as the Practice Table at the end will ſhew.

lb.
4) 346
20) 8|6 s. and 2 over, that is 2 three-pences
£ 4 6 6 the anſwer.

8. What does 353 lb. of ſalt come to at 4½d. a lb.

Divide 353 by 3 for 4d. the third part of 1s. to bring it into ſhillings, and then that quotient by 8; one halfpenny being the eighth part of 4d. Add theſe together and the product will be the anſwer.

lb.
3) 353
8) 117 s. 8d. 8d. being the 3d part of 2s.
Remains 14 s. 1d. and 5s. over, the 8th part of
Add this 7½ [which is 7½d.
20) 13|2 4½
£ 6 12 4½ the anſwer.

9. How much does 5960 yards come to at 1l. 17s. 9½d. a yard?

	£.	s.	d.		£.	s.	d.
At	1	0	0	a yard it comes to —	5960	0	0
For	0	10	0	do. that is ½ a £ add half of 5960—	2980	0	0
For	0	5	0	do. that is ½ 10s add half of 2980—	1490	0	0
For	0	2	6	do. that is ½ 5s. add half of 1490—	745	0	0
For	0	0	3	do. that is $\frac{1}{10}$th of 2s. 6d. add $\frac{1}{10}$th of 745—	74	10	0
For	0	0	0½	do. that is $\frac{1}{6}$ of 3d. add $\frac{1}{6}$ of 74 10—	12	8	4
				The anſwer £	11261	18	4

PRACTICE TABLE.

Of a Pound.

s.	*d.*		
10	0	is	$\frac{1}{2}$
6	8	—	$\frac{1}{3}$
5	0	—	$\frac{1}{4}$
4	0	—	$\frac{1}{5}$
3	4	—	$\frac{1}{6}$
2	6	—	$\frac{1}{8}$
2	0	—	$\frac{1}{10}$
1	8	—	$\frac{1}{12}$
1	3	—	$\frac{1}{16}$

Of a Shilling.

d.		
6	is	$\frac{1}{2}$
4	—	$\frac{1}{3}$
3	—	$\frac{1}{4}$
2	—	$\frac{1}{6}$
$1\frac{1}{2}$	—	$\frac{1}{8}$
1	—	$\frac{1}{12}$

Of a Ton.

Cwt.		
10	is	$\frac{1}{2}$
5	—	$\frac{1}{4}$
4	—	$\frac{1}{5}$
$2\frac{1}{2}$	—	$\frac{1}{8}$
2	—	$\frac{1}{10}$

Of a Hundred Weight.

qrs.		*lb.*		
2	or	56	is	$\frac{1}{2}$
1		28	—	$\frac{1}{4}$
		16	—	$\frac{1}{7}$
		14	—	$\frac{1}{8}$
		8	—	$\frac{1}{14}$
		7	—	$\frac{1}{16}$

Of a Quarter.

lb.		
14	is	$\frac{1}{2}$
7	—	$\frac{1}{4}$
4	—	$\frac{1}{7}$
$3\frac{1}{2}$	—	$\frac{1}{8}$

THINGS NECESSARY FOR EVERY ONE TO KNOW.

ALE AND BEER MEASURE.

2 Pints make 1 Quart
4 Quarts 1 Gallon
8 Gallons 1 Firkin of Ale
9 Gallons 1 Firkin of Beer
2 Firkins 1 Kilderkin
2 Kilderkins 1 Barrel
3 Kilderkins 1 Hogſhead
3 Barrels 1 Butt

WINE MEASURE.

4 Gills make 1 Pint
2 Pints 1 Quart
4 Quarts 1 Gallon
42 Gallons 1 Tierce
63 Gallons 1 Hogſhead
84 Gallons 1 Puncheon
1½ Tierce 1 Hogſhead
2 Hogſheads 1 Pipe or Butt
2 Pipes 1 Tun

By this Meaſure all Brandies, Spirits, Mead, Cyder, Perry, and Oil are meaſured.

DRY MEASURE.

2 Pints make 1 Quart
2 Quarts 1 Pottle
2 Pottles 1 Gallon
2 Gallons 1 Peck
4 Pecks 1 Buſhel
8 Buſhels 1 Quarter
5 Quarters 1 Wey or Load
5 Pecks 1 Buſhel of Water Meaſure
4 Buſhels 1 Coomb
10 Coombs 1 Wey
2 Weys 1 Laſt of Corn

By this Meaſure Salt, Lead-Ore, Oyſters, Corn, and other dry goods are meaſured.

CORN MEASURE.

2 Quarts make 1 Pottle
2 Pottles 1 Gallon
2 Gallons 1 Peck
4 Pecks, or 8 Gallons, 1 Buſhel *
8 Buſhels 1 Quarter or Vat
5 Quarters of Wheat, Beans, or Peas 1 Load
10 Quarters of Oats 1 Load

* *In Surry and ſome other counties the Buſhel contains 9 Gallons, but the price is eſtimated accordingly.*

COAL MEASURE.

4 Pecks make 1 Buſhel
9 Buſhels 1 Vat or Strike
36 Buſhels 1 Chaldron
21 Chaldrons 1 Score

Note. In 5 Chaldrons of Coals the Seller always gives 9 Buſhels over.

CLOTH MEASURE.

2¼ Inches make 1 Nail
4 Nails 1 Quarter of a Yard
4 Quarters 1 Yard
5 Quarters 1 Ell Engliſh
3 Quarters 1 Ell Flemiſh
6 Quarters 1 Ell French

Scotch and Iriſh Linens are bought and ſold by the Yard Engliſh; but all Dutch Linens are bought by the Ell Flemiſh, and ſold by the Ell Engliſh.

LONG MEASURE.

3 Barley-corns make 1 Inch
12 Inches 1 Foot
3 Feet 1 Yard
5½ Yards 1 Pole
40 Poles 1 Furlong
8 Furlongs 1 Mile
3 Miles 1 League
20 Leagues 1 Degree
69½ Miles 1 Degree

This treats of Length only.

SQUARE MEASURE.

144 Square Inches 1 Square Foot
9 Square Feet 1 Sq. Yard
30¼ Square Yds. 1 Sq. Pole
40 Square Poles 1 Sq. Rood
4 Square Roods 1 Sq. Acre
640 Square Acres 1 Sq. Mile

This includes Length and Breadth.

CUBIC MEASURE.

1728 Cubic Inches 1 Foot
27 Cubic Feet 1 Cubic Yard

This comprehends Length, Breadth, and Thickneſs.

AVOIRDUPOIZE WEIGHT.

16 Drams make 1 Ounce, marked — *oz.*
16 Ounces 1 Pound *lb.*
28 Pounds 1 Quarter of a Hundred — *qr.*
4 Quarters 1 Hundred or 112 lb. — *cwt.*
20 Hundred 1 Ton *T.*

Butter, Cheeſe, Fleſh, Grocery Wares, and all goods that have waſte, are weighed by this.

TROY WEIGHT.

4 Grains make 1 Carat
24 Grains 1 Pennyweight marked — *dwt.*
20 Pennyweights 1 Ounce *oz.*
12 Ounces 1 Pound *lb.*

By this Weight Jewels, Gold, Silver, Amber, &c. are weighed. 14 *Ounces,* 11 *Pennyweights, and* 15½ *Grains Troy, are equal to a Pound Avoirdupoize.*

APOTHECARIES WEIGHT.

20 Grains make 1 Scruple, marked — ℈
3 Scruples 1 Drachm ʒ
8 Drachms 1 Ounce ℥
12 Ounces 1 Pound, or Pint of Water *lb.*

Apothecaries compound their medicines by this Weight, but buy and ſell by Avoirdupoize.

WOOL WEIGHT.

7 Pounds make 1 Clove
2 Cloves 1 Stone
2 Stone 1 Todd
6½ Todd 1 Wey
2 Weys 1 Sack
12 Sacks 1 Laſt

HAY AND STRAW.

A Load of either contains 36 Truſſes
A Truſs of Hay 56 Pounds
A Truſs of Straw 36 Pounds

TIME.

60 Seconds make 1 Minute
60 Minutes 1 Hour
24 Hours 1 Day
7 Days 1 Week
4 Weeks 1 Month
13 Months, 1 Day, 6 Hours, or 365 Days, and 6 Hours, 1 Year.

THE END.

The following BOOKS may be had of the Publiſher of this TREATISE, and all Bookſellers.

1. FAMILY TABLES: being a collection of ſuch Tables as are uſeful to, and daily wanted in every family, accurately framed by Dr. JOHN TRUSLER. Small 4to. Price 3s. They will be ſufficient to anſwer all the purpoſes of life. The Tables are conciſe and in great variety; viz. Tables of Subtraction, Diviſion, Practice, Marketing, Wages, Time, Intereſt, Planting, Commiſſion, Brokerage, Reverſion, Annuities, Exchange, &c. &c. in ſhort, on every ſubject that can be wanted.

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⁂ An Edition of this work in Twelves may be had, price 3s. bound; containing a much fuller account of the Engliſh Hiſtory than could be comprized in the ſmall edition.

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of uſeful remarks not to be met with in any books of agriculture. Together with directions for Meaſuring Timber.

N. B. This work demonſtrates to a moral certainty, with good management, of clearing near near £400 a year on a farm of 150 acres of land.

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